SMOG CHECK PROGRAM FACT SHEET

Remote Sensing Device

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Clean air is everyone's job!

The Remote Sensing Device (RSD) measures and records the exhaust emissions of vehicles as they drive by, along with vehicle license plate numbers and other important information.

How does the Remote Sensing Device work?

- A narrow ray of infrared (IR) light is beamed across a lane of traffic and sensed by an infrared photoelectric detector. This detector converts the infrared energy to an electrical signal—the greater the infrared energy detected, the higher the electrical signal level and the lower the emission reading. Dirtier cars absorb more of the signal.
- The Remote Sensing Device detects hydrocarbons (HC), carbon monoxide (CO) and carbon dioxide ($C0_2$). Each absorbs infrared energy at different wavelengths. For example, the more CO in the exhaust gas, the more infrared energy at the CO wavelength that gets absorbed and the less energy in this region the detector sees. Therefore, the electrical signal is proportional to the gas concentration.

What equipment is required?

- The RSD uses an Infrared Source/Detector pair. The IR source emits the beam of IR energy which crosses the traffic lane to the IR detector. The beam is placed at the proper height to intersect the vehicle's exhaust plume.
- The system uses a high-resolution, high-speed video camera which takes a photograph of the rear of the vehicle, including its license plate, while the exhaust gas measurements are being taken. The license plate and the emissions readings are displayed on a video monitor which is observed by an operator.
- The video image is digitized and decoded using an optical character recognition system that automatically identifies, reads, and merges the license plate number with the vehicle's exhaust emissions readings.
- The system uses a known calibration gas at frequent intervals to calibrate the sensor to maintain its accuracy.
- The system uses features that detect the vehicle's mode of operation, such as speed and acceleration/deceleration, at the time the exhaust emissions are measured.
- The system uses a vehicle counter device to keep track of the total traffic flow.
- A computer system is used to control the entire process and record all data collected.